Physician Use of Interactive Functions in Diagnostic Decision Support Systems

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Introduction. Research on diagnostic decision support systems (DDSS) has tended to focus on the ability of the DDSS to analyze complex clinical cases without knowing to what extent such case analyses and other advanced system features are actually used by physicians in practice. We conducted an international mail survey of the users of QMR™, a well-known DDSS, to determine which functions physicians felt confident in using correctly.

Methodology. Our questionnaire was included with a routine QMR update to approximately 2,070 users by First DataBank, the commercial distributors of QMR. Survey responses were sent directly to the researchers. Each respondent was asked to identify which of twelve QMR functions "that you feel confident in using correctly". The twelve functions were subsequently categorized by the researchers into three categories: *Explore* (n=6 functions) which were explorations of diseases and findings not tied to extensive patient specific data; *Case Analysis* functions (n=3), which related to detailed analyses of specific patient data; and *Information Management* functions (n=3), which related to saving and printing program output. Each of these categories included basic and advanced functions. Each respondent was also asked to report their years of clinical experience and their medical specialty.

Data Analysis. The proportion of users who felt confident about using a function was computed for each individual function and each function category. A three-factor analysis of variance (ANOVA) for repeated measures was used to determine if there were significant differences in the proportion of respondents who were confident among the three different types of functions (Explore, Case Analysis, Information Management) and between the two levels of function sophistication (Basic vs Advanced) and whether the internists (between-subjects factor) differed from the non-internists in their use of the functions.

Results. A total of 254 users responded to the survey, 247 of whom indicated a specialty. The median year of completion of medical school was 1978 and the median year of completion of residency was 1982. Most (82%) were at least general board-certified. The sample included 65% internists, 31% family physicians and 4% other specialties.

Confidence in using the functions ranged from a high of 90% for the simple differential diagnosis function, to a low of 30% for the critique function. Across all functions the mean proportion comfortable with using the functions was .54. A significantly ($p<.001$) higher mean proportion (.57 vs .45) of users expressed confidence in using the basic functions than the advanced functions. A significantly ($p<.001$) higher proportion (.68 vs .41, .44) of users were confident in using the exploration functions than either of the other two types of functions.

There was also a significant ($p=.01$) interaction of function type and function sophistication which indicated that the mean proportion of users more confident in the basic vs advanced functions was less pronounced for the case analysis function than for the other two function types. There was no main significant difference between specialties in the overall mean proportion of users confident in using the different types of functions, regardless of function type or level of sophistication. There was a statistically significant ($p=.01$) interaction of function type and specialty. For the functions in the explore and case analysis groups, a higher proportion of the internists tended to report confidence than the non-internists, while for the information management functions, the direction was reversed.

Conclusion. Although DDSS may provide users with several sophisticated decision support functions, users tend to use a limited number of these functions. A study of the utility of the more simple DDSS functions, in addition to the case analysis on which most research has focused, may be warranted to get a more complete picture of how physicians utilize and respond to DDSS suggestions.

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